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INTELLIGENCE MEMORANDUM

# STATUS OF DISPERSAL OF INDUSTRY IN THE USSR 1951-58

CIA/RR IM 59-15

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~~WARNING~~

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CENTRAL INTELLIGENCE AGENCY

Office of Research and Reports

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## FOREWORD

This memorandum examines the question "Did the USSR decide to disperse industry during 1951-58 as a measure of national defense, and, if so, are there indications that such a program has been successful?"

Although the conclusions reached are believed to be valid, the following two factors limited the analysis: (1) sampling was necessarily used in the examination of industries and cities, and (2) a definite lag exists in the receipt of intelligence information on the precise location of new manufacturing plants within a city area. This lag may be as much as 2 years and represents the difference in time between the mention of a new plant in Soviet news media and the receipt of observational reports.

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# STATUS OF DISPERSAL OF INDUSTRY IN THE USSR* 1951-58

## Summary and Conclusions

On the basis of a series of selected case studies, it is concluded that increased dispersal of Soviet industry which would significantly reduce vulnerability to air attack with nuclear weapons was not achieved during 1951-58.

Dispersal was examined against three measures which might reduce the vulnerability of industry to nuclear attack. These are (1) multiplication of plant locations (multiple dispersal of units), (2) location of new industrial sites in areas near but outside large urban centers (urban dispersal), and (3) economic regionalization (geographic dispersal).

### Multiple Dispersal of Units

The method of multiple dispersal of units is based on dividing the total production of a specific product among several plant units. Numerous plants manufacturing the same product and scattered throughout the country would have a greater rate of survival under nuclear attack than would a few large installations situated in principal cities. As a result of an analysis of three Soviet industries, the electron tube industry, the tractor industry, and the rubber tire industry, which are considered important for both peacetime and wartime production, it was concluded that no radical multiplication of plants occurred between 1951 and 1958. In the electron tube industry, no construction of plants at new locations has been initiated since 1951. Two new tractor plants were added to the 11 existing in 1951. No new tire plants entered production during 1951-58, although four were reported as projected or under construction.

### Urban Dispersal

Evidence is available that another method of dispersal has been considered in the USSR -- that of locating new industrial sites at certain minimum distances from major urban areas and at specific

* The estimates and conclusions in this memorandum represent the best judgment of this Office as of 1 July 1959.

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distances from other important installations. Five cities of the USSR -- Chelyabinsk, Khabarovsk, Stalingrad, Kalinin, and Krasnoyarsk -- were examined to determine whether or not significant new industry was being built in a pattern suggesting the use of norms for dispersal. The facilities constructed during 1951-58 in the five cities do not reveal any standardized pattern of dispersal. New plants have been located largely in industrial sections of the cities or on the periphery of the urban area. One exception was found at Krasnoyarsk, where two new plants were located away from the city. However, numerous other new plants were constructed in the mushrooming southern industrial section of Khabarovsk.

Economic Regionalization

The program of economic regionalization in the USSR has resulted in the construction of new industry in formerly underdeveloped regions, chiefly in the eastern USSR. Because of this new construction, production in those regions has increased significantly. However, the share of total industrial production represented by industry in newly developed regions is still proportionally small, and the bulk of production still is being concentrated in the western RSFSR, the Ukraine, and the Ural regions.

Several factors have modified the effect of the program of economic regionalization on the dispersal of industry in the USSR. First, the insistence on speed in achieving production goals, together with Soviet dependence on rehabilitation and expansion of existing industrial facilities, probably has reduced the resources available for construction in the regions being developed. Second, the priority given to expansion of heavy industry has dictated that industrial facilities be located near the resources of fuel, power, and ore. Third, the location of the transportation network -- most importantly, its railroad segment -- also has modified dispersal. Transportation facilities are concentrated in the western USSR and tie the principal agricultural areas to established industrial and urban centers. The USSR has been unwilling to allocate the resources required to expand the transportation network in the newly developed eastern regions. Essentially, regionalization in the USSR has been guided thus far by normal factors of locating plants, such as the urgency of production, as well as requirements for transportation, markets, labor, power, and materials. The development of industry in the eastern regions has reduced vulnerability to nuclear attack only to a limited degree.

There are indications that the USSR considered and may have adopted specific measures to effect urban dispersal of industry in 1956 or 1957. Because of the lapse of time inherent in construction plus time lags in intelligence reporting, no conclusive data are available on the implementation of such a plan.

Research for this memorandum has failed to find evidence that the USSR made a concerted effort to disperse industry with any significant effects during 1951-58. Some evidence was found, however, of a recent plan for urban dispersal of industry.

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## I. General Concepts of the Dispersal of Industry in the US and the USSR

According to a manual of the US Atomic Energy Commission, the two principal categories of protection from the effects of nuclear weapons are shielding and distance from the explosion. As applied to manufacturing plants, these categories may be translated into the dispersal** and hardening*** of industrial sites. The US National Security Resources Board was instructed in 1947 to consider "the strategic relocation of industries, services, government, and economic activities, the continuation of which is essential to the nation's security." Studies, articles, and reports on the subject of industrial vulnerability published in the US since that time generally urge that the dispersal of industry away from cities which would be primary targets be considered in constructing new plants. Relocation of established industries has not been widely recommended, because of the cost and the loss of production which would result. More effective weapons have, of course, forced reconsideration of minimum distances recommended earlier between possible target areas and locations of new plants.

There are at least two principal methods of dispersal of industry which could aid in reducing vulnerability of industrial targets. The first is multiple dispersal of units, a multiplication of installations to reduce the possibility that a specific industry would be severely crippled by only a few air strikes. For example, 40 plants producing the same product and scattered throughout the country would be less vulnerable than four plants located in three or four principal cities.

The second method of dispersal, urban dispersal, the one most favored by US authorities, is to locate important plants at a minimum distance from major cities or other installations which in themselves present targets of primary importance for nuclear bombing.

** Some US studies have used the term dispersion in this sense, reserving the word dispersal to describe tactical evacuation of personnel from threatened cities.

*** The term hardening refers to the use of special construction to reduce blast damage.

The USSR and other countries of the Soviet Bloc do not publish openly theories or plans related to the dispersal of industry to reduce vulnerability to attack. However, glancing references do appear from time to time indicating an awareness of the problem and a desire to reduce the concentration of industry in the older cities and in the western regions of the USSR.

In the USSR, consideration of the first method suggested for achieving dispersal (increasing the number and location of plants) is complicated by former Soviet concepts of vulnerability to European-based land attack and short-range bombing plus the Soviet program to expand the over-all economic base of the country by developing new industry in regions such as Siberia and Kazakhstan. World War II forced the USSR to move many industries from the western regions and the Ukraine to the Urals and farther east. Since World War II, efforts have been and are being made to expand industry in the eastern regions of the USSR and to exploit the natural resources in remote regions. This regional development has been a constant theme of Soviet economic policy.

In discussing war and postwar regional development, one Soviet writer stated: "The creation of a complex economy in the eastern regions assured an uninterrupted growth of the defense potential of the country." In this context, it is possible that the author was referring more to the over-all expansion of industry to increase the economic strength of the country rather than to a consideration of vulnerability of targets. Soviet spokesmen occasionally have conceded that the development of new regions is a "strategic plus." For example, Marshal Budenny was quoted early in 1956 as saying that the program of the government for dispersing industry and setting up an industrial center in Siberia was due partly to considerations of defense. Khrushchev noted during a press interview in 1957, "Our industries are more widely dispersed [than those of the US]. Moreover, the reorganization of industry [is] also a plus strategically, [a] collateral but a very important one."*

## II. Countrywide Dispersal of Selected Industries

An examination of three Soviet industries, the electron tube industry, the tractor industry, and the rubber tire industry, to determine whether or not the USSR has accomplished a significant reduction in the vulnerability of each industry to nuclear attack by establishing new plants in additional locations is inconclusive. The weight of available evidence, however, suggests that significant reduction of vulnerability

* For a discussion of new developments in concepts of dispersal, see V, p. 14, below.

was not accomplished during 1951-58. The plants built in new locations probably could all be justified on the basis of planned regionalization of the country or on the basis of normal economic factors. All new plants have been built in or close to the existing centers of population and the area of advantageous land use, and they are accessible to the existing rail network. In one case, at Dnepropetrovsk, the establishment of a second tire plant was being negotiated in 1957. Such duplication of facilities indicates a negation of the concept of countrywide dispersal.

A. Electron Tube Industry

Available intelligence indicates that the 13 Soviet electron tube plants were built before 1951, as shown in Table 1.* Apparently, there has been no new construction which might reduce the vulnerability of the industry to nuclear attack during 1951-58.

B. Tractor Industry

Of 14 Soviet tractor plants, 11 were constructed before 1951, as shown in Table 2.** Two new plants (at Petrozavodsk and Bryansk) have been developed on the site of established industries and thus represent an adaptation and expansion of existing facilities rather than entirely new industrial installations. Both are located in the European USSR, and neither can yet be classed as a major producer. A new tractor plant, to be constructed between 1960 and 1965, is projected in Chita.

C. Rubber Tire Industry

The Soviet rubber tire industry has 11 plants constructed before 1951 and located in or near large cities or cities of industrial significance, as shown in Table 3.*** Of four new sites, two are located in important cities of the European USSR, one at Baku and the other at Dnepropetrovsk. The latter city now has two tire manufacturing plants. Two new additional plants, publicized as being under construction, are located at Krasnoyarsk and Usol'ye Sibirskoye (near Irkutsk) in eastern Siberia. The latter two plants might be cited as an example of dispersal to reduce vulnerability to nuclear attack. Increasing needs caused by the general developmental program in Siberia, however, also would appear to justify the location of at least one tire plant in that area.****

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* Table 1 follows on p. 6.
** Table 2 follows on p. 7.
*** Table 3 follows on p. 8.
**** Text continued on p. 9.

Table 1

Electron Tube Plants in the USSR a/
1958

| Location | Plant Identification | Location of Site |
|---|---|---|
| | Constructed Before 1951 | |
| Leningrad | Svetlana, No. 211 | Within the city |
| Leningrad | NII No. 380 | Within the city |
| Moscow | MELZ, No. 632 | Within the city |
| Moscow b/ | Electrovacuum Plant No. 399 | Within the city |
| Moscow c/ | No. 591 | Within the city |
| Fryazino | NII No. 160 | Outside the city |
| Zaprudnya d/ | No. 593 | Outside the city |
| Tomilino | Electrovacuum Plant | Outside the city |
| Novosibirsk | No. 617 | Contiguous to the city |
| Saratov e/ | No. 68 | Outside the city |
| Tashkent f/ | No. 191 | Within the city |
| L'vov g/ | Electric Lamp Plant | Within the city |
| Moscow | MAZ, No. 498 | Within the city |
| | Constructed or Reconstructed, 1951-58 | |
| | None | |
| | Projected or Under Construction | |
| | None | |

a.
b.
c.
d.
e. Under construction during 1950-52.
f.
g.

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Table 2

Tractor Plants in the USSR a/
1958

| Location | Plant Identification | Location of Site |
|---|---|---|
| **Constructed Before 1951** | | |
| Leningrad | Kirov Works | Within the city |
| Minsk | Minsk Tractor Plant | Contiguous to the city |
| Khar'kov | Khar'kov Tractor Plant | Contiguous to the city |
| Khar'kov | Khar'kov Tractor Assembly Plant | Unknown |
| Dnepropetrovsk | Tractor Plant | Contiguous to the city |
| Vladimir | Vladimir Tractor Plant | Contiguous to the city |
| Lipetsk | Lipetsk Tractor Plant | Outside the city |
| Stalingrad | Stalingrad Tractor Plant | Within the city |
| Chelyabinsk | Chelyabinsk Tractor Plant | Within the city |
| Tashkent | Tashkent Agricultural Machinery Plant | Contiguous to the city |
| Rubtsovsk | Altay Tractor Plant | Contiguous to the city |
| **Constructed or Reconstructed, 1951-58** | | |
| Petrozavodsk b/ | Onega Tractor Plant | Within the city |
| Bryansk c/ | Tractor Plant | Unknown |
| **Projected or Under Construction** | | |
| Chita d/ | Unknown | Unknown |

a.
b. Converted from an existing machinery plant in 1956.
c. Built on the site of a former steel plant in 1956.
d.

Table 3

Rubber Tire Plants in the USSR a/
1958

| Location | Plant Identification | Location of Site |
|---|---|---|
| **Constructed Before 1951** | | |
| Yaroslavl' | Yaroslavl' Rubber and Asbestos Combine, "Yarak" | Within the city |
| Omsk | Omsk Rubber Products Plant | Within the city |
| Moscow | Moskva Tire Plant | Within the city |
| Kirov | Tire Plant, "Shini" | Within the city |
| Leningrad | Leningrad Rubber Tire Plant, "Krasnyy Treugol'nik" | Within the city |
| Voronezh | Voronezh Synthetic Rubber Plant | Within the city |
| Sverdlovsk | Sverdlovsk Tire Plant, "Uktus," No. 721 | Outside the city |
| Yerevan | Yerevan Synthetic Rubber and Chemical Plant, "Kirov," No. 741 | Within the city |
| Dnepropetrovsk | Dnepropetrovsk Tire Plant | Contiguous to the city |
| Nizhniy Tagil | Nizhniy Tagil Railroad Car Manufacturing Plant, "Kaganovich," No. 183 | Outside the city |
| Fosforitnaya | Vulcanizing Plant | Contiguous to the city |
| **Constructed or Reconstructed, 1951-58** | | |
| | None | |
| **Projected-or-Under-Construction** | | |
| Baku b/ | Baku Tire Plant | Unknown |
| Dnepropetrovsk c/ | Unknown | Unknown |
| Usol'ye Sibirskoye d/ | Rubber Tire and Products Plant | Unknown |
| Krasnoyarsk e/ | Tire Plant | Unknown |

a.
b. Publicized as under construction in 1957.
c. Negotiations for construction underway in 1957.
d. Publicized to be constructed in 1956.
e. Publicized as under construction in 1956-58.

## III. City Areas of the USSR*

### A. Chelyabinsk

No significant new industry has been located in Chelyabinsk (55°10' N - 61°24' E) since 1951. Additional review of the area around Chelyabinsk to a distance of 15 kilometers (km)** revealed no other significant new industry.

Two older industrial areas, however, are located outside the principal city area. At Bakal (Sotsgorod), about 5 km to the north, is an industrial complex centered around the Chelyabinsk Steel Plant, "Bakalstroy." There is also an older mining machinery plant at Kopeysk, 8 km east of Chelyabinsk. Both locations were developed before 1951 and thus cannot be considered to have been dispersed because of urgent considerations of vulnerability to large nuclear weapons.

### B. Khabarovsk

An examination of the city of Khabarovsk (48°30' N - 135°06' E) and its environs does not reveal a pattern of industrial dispersal, although significant new industry has been built.

At least four new, large plants are known to be in production or nearing completion in Khabarovsk, including the Amur Cable Plant, a heating equipment plant, a machine tool plant, and an oil and fats combine. All of these installations, however, are located either in the city or near it and cannot truly be said to be dispersed in a manner which would substantially reduce vulnerability to attack or which would indicate that minimum norms of distance were used in the selection of sites.

Additional review of the intelligence information on the area around Khabarovsk to a distance of 15 km revealed no other significant new industry.

### C. Stalingrad

Stalingrad (48°45' N - 44°25' E), including the regions of Beketovka and Krasnoarmeysk, is strung along the west bank of the

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* Five selected cities scattered throughout the USSR were examined to determine whether or not new industry was being located during 1951-58 in any pattern which would suggest the use of norms for dispersal, that is, the construction of new plants at a distance from existing industry or from the city proper.

**

Volga River in somewhat the shape of a buttonhook or dipper. The elongated shape of the urban area should tend to reduce its vulnerability.

Since 1951, three significant new industrial installations have been reported in the area. These include an aluminum plant, a rolling mill, and an oil refinery. The aluminum plant is located approximately 1 km from the northwestern urban area, and the rolling mill at a distance of about 4 km. The oil refinery is about 2 km east of Krasnoarmeysk and rather less than that from an older industrial complex which contains a railroad tie plant, a wood processing plant, and a creosoting plant. All three new installations are better described as being peripheral to urban areas rather than as at a distance from urban areas.

Additional review of the intelligence information on the area around Stalingrad to a distance of 15 km revealed no other significant new industry.

D. Kalinin

Two new plants have been publicized as being constructed "in" Kalinin (56°52' N - 35°55' E) in 1955 -- a "large" silk weaving mill and a canning plant. Their exact locations are not known.

Additional review of the intelligence information on the area around Kalinin to a distance of 15 km revealed no other significant new industry.

E. Krasnoyarsk

Located on the Yenisey River, Krasnoyarsk (56°02' N - 92°48' E) is undergoing rapid expansion. The older city on the north bank of the river is hemmed in to some extent by high ground to the north and west. Principal industrial expansion during 1951-58 has taken place in the plant section south of the river. New or projected industry in this area during 1951-58 included a silk combine, a ferroconcrete products plant, a furniture plant, a metal utensil plant, a medical preparations plant, a yeast plant, and probably the rubber tire plant.* One observer, in 1955, stated that the area across the river from the old city resembled one huge construction camp.

Unlocated new plants include a margarine plant, a piano plant, a printing house, a felt processing plant, and a television plant. The latter is said to be on the western outskirts of the city.

* See II, C, p. 5, above.

Two new plants lie outside the city area and could represent a modest effort at dispersal. The first, publicized as being the largest aluminum combine in the USSR, reportedly was under construction in June 1956 at the village of Korkino (56°05' N - 93°02' E), about 8 km northeast of the old city. A second new plant outside the city was observed to be under construction in 1956 at the village of Bugach, about 8 km west of the city. The nature of this plant is unknown.

Additional review of the intelligence information on the area around Krasnoyarsk to a distance of 15 km revealed no other significant new industry.

## IV. Soviet Locational Theory and Regionalization

Economic policy in the USSR is determined by the Communist Party and the state, and economic plans, when issued, have the effect of law. The location of industry, therefore, is determined by the state in accordance with socialist concepts.

A primary concept in Soviet socialist economics has been the planned, proportional development of the national economy. In fact, it has been said that the correct territorial distribution of industry is an indispensable element of economic planning. The Soviet State Planning Commission (Gosplan) is obligated to plan (1) for the efficient distribution of productive capacities, taking into consideration the complex developmental needs of economic regions; (2) for the necessity of moving enterprises closer to the sources of raw materials and consuming regions; and (3) for the elimination of long-distance moves and crosshauls on the transportation network.

Since 1954 the following list of locational factors to be taken into account when establishing new industry has appeared several times in Soviet publications:

1. It is sought to place the industries as near as possible to the sources of raw materials and to the regions where the products of industry are used.

2. The sites of the industrial establishments are chosen in such a manner that the setting up of new industries contributes to the economic advancement of the previously backward regions of the USSR, inhabited by the national minorities. The purpose is to consolidate the friendship between the nationalities by creating a material basis on which their collaboration would be developed.

3. The industries are located so as to realize a sound territorial distribution of the productive effort among the various economic regions of the country. It is considered imperative to develop the economy of each region as a working complex, possessing the necessary powerplants and light industry, and producing its own building materials and foods. The location of natural resources in different regions is taken into account.

4. In setting up new industrial establishments, due consideration is given to the necessity of promoting close relationships between workmen and peasants. The aim is to eliminate all substantial differences between cities and villages.

5. The selection of the sites of the industrial establishments is made with appropriate regard for the necessity of strengthening the defensive capacity of the country.

A recent independent study of the USSR has pointed out that a number of modifying factors have had significant effects in the choice of industrial locations. First of all has been the insistent Soviet pressure on industry to increase production rapidly. Movement into new regions has been negated in part because speed was more easily attainable by building up settled industrial centers. Second, the priorities given to the expansion of heavy industry have meant that the establishment of other industry has in general followed the establishment of heavy industry or has been located near the resources of fuel, power, and ores which the priority industries require. A third modifying effect has been exercised by the Soviet transportation network which is largely dependent on railroads, and rapid industrial expansion has been possible only in regions accessible to Soviet railroads. A dense rail network, a relatively heavy density of population, the principal agricultural regions, and regions more hospitable climatically are all nearly coincidental in the European USSR and the region of the Ural Mountains, where all except a minor part of Soviet industry has been concentrated.

Historically, the USSR has sought a regional pattern of industrial development, particularly desiring eastward expansion which received its greatest impetus under the emergency conditions of World War II. The development of new regions is often discussed in Soviet writings, and, at first glance, it would seem that regional autarky was desired. Full autarky, however, is not the goal, because every Soviet economic region is recognized as a special complex. Each region is to develop primarily those branches of industry for which it is particularly suited. Certain economic activities, primarily heavy industries, are located independently of economic regions, particularly when they

require raw materials or labor resources peculiar to specific geographic areas. On the other hand, each region is expected where possible to develop food, clothing, footwear, and chemical industries. Likewise, the regions are expected to exploit building materials available locally and to provide their own power.

The regionalization of industry itself is expected to benefit defense. One writer states [redacted]:

> The importance of more uniform distribution of industry is very great from the point of view of strengthening the defense potential of the USSR. The defense potential is strengthened when it has numerous industrial bases, including ones deep within the country, and when local industry is developed extensively ... . The fundamental requirements of defense in the distribution of industry ... the location of enterprises deep within the country and the creation of relatively dispersed industrial bases in various parts of the country ... are met by the carrying out of more uniform distribution of industry, proximity of industry to sources of raw materials and consuming regions, accelerated industrialization of national districts and formerly backward regions, and the complex development of the economy of each economic region.
>
> The carrying out of the requirements of socialist distribution of industry is tied to the rapid development of industry in the East, in regions possessing tremendous natural resources ... the most vital raw materials, fuels, and power resources. This movement of industry to the East fully coincides with defense needs.

Expansion to the east, development of new regions, and economic regionalization are thus acknowledged and continuing goals of the USSR. Much has been written pointing out that in practice these goals have not been substantially attained. New industrial regions such as the Kuzbas have been developed, and others such as Kazakhstan and the Irkutsk region are now under development.

Nearly every region in the USSR has had an impressive scale of growth. Spectacular growth of production in new regions, however, has been matched or exceeded by growth in established regions.

The industrial production of the USSR, by region, during 1940-55 is shown in Table 4.* A review of the table reveals that the three older industrial regions (western RSFSR, the Ukraine, and the Ural regions) still produce most of the national product. Until 1955 the growth of industry in the eastern regions has been quantitatively substantial, but in relation to total production of industry, the relative share of the eastern regions in Soviet production was not significant. Regions in which industry had long been established have developed as fast as or faster than the regions developed in recent years because growth is easier and more feasible in areas where labor, transportation, and ancillary facilities are already at hand.

## V. Indications of a New Policy Toward Dispersal

Past efforts at dispersal of industry in the USSR do not appear to have been successful except as the development of economic regions and new industrial sections has had the added effect of multiplying the number of urban or industrial targets. The concept of locating new industry at specified minimum distances from possible target cities or other industrial targets seems to be of recent origin and almost certainly postdates the Stalin era.

Soviet articles written on military theory since Stalin's death have stressed the threat of nuclear warfare, the development of air defense and civil defense, concern about surprise nuclear attack, and the importance of protecting the rear areas.

On at least three occasions since 1954, there has appeared in print a list of locational factors for Soviet industry which lists as the final criterion for the selection of sites, regard for the necessity of "strengthening the defensive capacity of the country."** Originally included in the writings of economists, the most recent listing of these criteria appeared in a book linking strategy to economics, which was published by the Ministry of Defense in 1957. The USSR has thus expressed an awareness of the threat to its industrial establishment and a desire to consider national defense in locating new plants.

An East German document published in 1957 reveals civil defense planning and gives norms for dispersal of construction of new industry in East Germany. For planning purposes, cities and industrial enterprises are to be placed in four graduated categories of importance

* Table 4 follows on p. 15.

** See pp. 11-12, above.

Table 4

Industrial Production in the USSR, by Region a/
Selected Years, 1940-55

| Commodity | Unit | Year | Total USSR | Western RSFSR | | Ukraine | | Urals | | Western Siberia | | Kazakhstan | | Others | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Amount | Percent of Total | Amount | Percent of Total | Amount | Percent of Total | Amount | Percent of Total | Amount | Percent of Total | Amount | Percent of Total |
| Steel | Thousand Metric Tons | 1940 | 18,317.2 | 3,453.5 | 18.9 | 8,938.2 | 48.8 | 3,924.4 | 21.4 | 1,869.5 | 10.2 | b/ | b/ | 131.6 | 0.7 |
| | | 1945 | 12,251.7 | 1,755.3 | 14.3 | 1,373.7 | 11.2 | 6,493.8 | 53.0 | 2,408.2 | 19.7 | 4.6 | b/ | 216.1 | 1.8 |
| | | 1950 | 27,329.0 | 4,402.6 | 16.1 | 8,350.9 | 30.6 | 10,722.8 | 39.2 | 3,014.5 | 11.0 | 131.2 | 0.5 | 707.0 | 2.6 |
| | | 1955 | 45,271.5 | 5,947.2 | 13.1 | 16,934.7 | 37.5 | 16,380.8 | 36.2 | 3,857.4 | 8.5 | 234.5 | 0.5 | 1,916.9 | 4.2 |
| Coal | Million Metric Tons | 1940 | 165.9 | 21.9 | 13.2 | 83.8 | 50.5 | 12.0 | 7.2 | 22.5 | 13.6 | 7.0 | 4.2 | 18.7 | 11.3 |
| | | 1945 | 149.3 | N.A. | N.A. | 30.3 | 20.3 | N.A. | N.A. | N.A. | N.A. | 12.0 | 8.0 | 107.0 | 71.7 |
| | | 1950 | 261.1 c/ | 58.4 | 22.4 | 78.0 | 29.9 | 32.5 | 12.4 | 38.5 | 14.7 | 17.4 | 6.7 | 36.4 | 13.9 |
| | | 1955 | 391.3 | 79.2 | 20.2 | 126.0 | 32.2 | 47.1 | 12.0 | 58.5 | 15.0 | 28.0 | 7.2 | 52.5 | 13.4 |
| Electric Power | Billion Kilowatt-Hours | 1940 | 48.3 | 21.3 | 44.2 | 12.4 | 25.7 | 6.2 | 12.8 | 1.9 | 3.9 | 0.6 | 1.2 | 5.9 | 12.2 |
| | | 1945 | 43.3 | N.A. | N.A. | 3.1 | 7.2 | N.A. | N.A. | N.A. | N.A. | 1.1 | 2.5 | 39.1 | 90.3 |
| | | 1950 | 91.2 | 34.7 | 38.0 | 14.7 | 16.1 | 18.4 | 20.2 | 5.9 | 6.5 | 2.6 | 2.9 | 14.9 | 16.3 |
| | | 1955 | 170.2 | 63.0 | 37.0 | 30.1 | 17.7 | 32.6 | 19.2 | 11.7 | 6.9 | 5.7 | 3.3 | 27.1 | 15.9 |
| Cement | Thousand Metric Tons | 1940 | 5,675 | 2,725 | 48.0 | 1,218 | 21.5 | 345 | 6.1 | 263 | 4.6 | b/ | b/ | 1,124 | 19.8 |
| | | 1945 | 1,845 | 536 | 29.0 | 335 | 18.2 | 277 | 15.0 | 147 | 8.0 | b/ | b/ | 550 | 29.8 |
| | | 1950 | 10,194 | 4,370 | 42.9 | 2,013 | 19.7 | 921 | 9.0 | 567 | 5.6 | 16 | 0.2 | 2,307 | 22.6 |
| | | 1955 | 22,484 | 9,263 | 41.2 | 4,618 | 20.5 | 2,827 | 12.6 | 1,194 | 5.3 | 365 | 1.6 | 4,217 | 18.8 |
| Leather Shoes | Million Pairs | 1940 | 211.0 | 125.4 | 59.4 | 40.8 | 19.3 | 9.3 | 4.4 | 4.4 | 2.1 | 1.2 | 0.6 | 29.9 | 14.2 |
| | | 1945 | 63.1 | 34.6 | 54.9 | 3.8 | 6.0 | 7.9 | 12.5 | 4.3 | 6.8 | 1.6 | 2.5 | 10.9 | 17.3 |
| | | 1950 | 203.4 | 111.4 | 54.7 | 28.8 | 14.2 | 14.3 | 7.0 | 7.3 | 3.6 | 3.4 | 1.7 | 38.2 | 18.8 |
| | | 1955 | 274.3 | 133.6 | 48.7 | 43.8 | 16.0 | 21.7 | 7.9 | 10.0 | 3.6 | 6.3 | 2.3 | 58.9 | 21.5 |

a.
b. Negligible.
c. Total is derived from unrounded data and does not agree with the sum of the rounded components.

to civil defense -- first, second, third, and unclassified. Some of the norms given in the document are as follows:

1. As a general rule, new industrial enterprises, either classified by civil defense category, I, II, III, or of considerable size, must not be erected within towns of the higher categories, 1, 2, or 3.

2. In erecting new industrial areas or establishments, the minimum distance between the outskirts of cities of the first three civil defense categories and the enterprise must be 10 km for a first category enterprise, 6 km for a second category enterprise, and 3 km for a third category enterprise.

3. Distances must also be maintained between industrial areas or groups of enterprises ranging from 10 km between those of first category importance down to 5 km between those of third category importance.

4. Additional norms for dispersal are listed for residential areas and railroad and service installations.

Satellite civil defense is guided by the USSR, and East German civil defense officials were trained at a civil defense school in the USSR. Graduates of this school probably participated in developing plans for East German civil defense. It could be argued by analogy, therefore, that the USSR probably had adopted a set of norms for dispersal of new industry at the same time or earlier than the adoption of such norms by East Germany in 1957.

Perhaps by coincidence, a program for the development of "satellite" towns around major Soviet cities such as Moscow, Leningrad, and Kiev was first publicized late in 1956. Such satellite towns will have their own industry as well as residential sections. If the program to construct satellite towns in the USSR is a reflection of dispersal of industry to effect reduction of urban vulnerability, it is a long-term program and originated as recently as 1956.

Early in 1959, Hungary publicized a program to disperse industry, in particular locating new industry outside Budapest, which allegedly is overcrowded. A Polish broadcast in 1958 referred to "provision" for the construction of "big towns" away from existing industrial areas. This publicity may also be an echo of Soviet concern for dispersal of industry.

The timing of the developing revision in Soviet strategic thought, the East German document on planning, the program for developing satellite towns in the USSR, and European Satellite publicity regarding dispersal of industry combine to suggest that some basic decision was taken about 1956 to disperse new industry in the Soviet Bloc, including the USSR, to locations outside existing urban complexes or away from other possible target areas. If this date is correct, dispersal of future industrial sites for the reduction of vulnerability to air attack may be expected during 1959-65. On the other hand, the continuing demands on the part of the Soviet leaders for maximum possible increases in industrial production during the current Seven Year Plan could force compromises between attempts to disperse industry and efforts to conserve investment resources.

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APPENDIX A

GAPS IN INTELLIGENCE

Two principal gaps in intelligence became evident during the preparation of this memorandum. First, because of the security which governs defense matters, specific plans or recommendations prepared for the dispersal of Soviet industry were not found. It is unlikely that achievements in dispersal will be publicized except in general terms. The second gap, which is growing, concerns the exact location of new industry. Soviet press and radio items link new plants to a city or town, but the precise location in the area or city is less often mentioned.

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APPENDIX B

SOURCE REFERENCES

The source material used in this memorandum falls into four general categories, as follows: (1) unclassified public information, (2) interrogation of defectors and refugees, (3) covert reports, and (4) finished intelligence reports.

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Evaluations, following the classification entry and designated "Eval.," have the following significance:

| Source of Information | Information |
|---|---|
| Doc. - Documentary | 1 - Confirmed by other sources |
| A - Completely reliable | 2 - Probably true |
| B - Usually reliable | 3 - Possibly true |
| C - Fairly reliable | 4 - Doubtful |
| D - Not usually reliable | 5 - Probably false |
| E - Not reliable | 6 - Cannot be judged |
| F - Cannot be judged | |

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this memorandum. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

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Except for finished CIA intelligence, all sources used in this memorandum are evaluated RR 2 unless otherwise indicated.

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